

**Part 23—Airworthiness Standards: Normal, Utility,
Acrobatic and Commuter Category Airplanes**

This change incorporates Amendment No. 23-41, Small Airplane Airworthiness Review Program Amendment No. 5, effective November 26, 1990, in Federal Aviation Regulation Part 23.

The effective date of the new material, which is marked by black brackets, is carried at the bottom of each page. Preamble pages and rearranged pages having no new material carry the change number only.

Page Control Chart

Remove Pages	Dated	Insert Pages	Dated
VII	2/17/87	VII	11/26/90
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		P-379 thru P-384	Ch. 29
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	(Corrected)		(Corrected)
66-2	2/17/87	66-2	11/26/90
66-3	2/17/87	66-3 and 66-4	11/26/90
66-4	Ch. 22	66-5	11/26/90
		66-6	Ch. 29

Suggest filing this transmittal at the beginning of the FAR. It will provide a method for determining that all changes have been received as listed in the current edition of AC 00-44, Status of Federal Aviation Regulations, and a check for determining if the FAR contains the proper pages.

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airworthiness standards for the instrument configuration for general, air taxi and commercial operations. This amendment updates the airworthiness and operating requirements to reflect advanced technology being incorporated in current designs while maintaining an acceptable level of safety.

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SUPPLEMENTARY INFORMATION:

Background

This amendment is based on Notice of Proposed Rulemaking, Notice No. 89-6, published on March 6, 1989 (54 FR 9338). All comments received in response to Notice No. 89-6 have been considered in adopting this amendment.

Related Activity

The FAA announced its Small Airplane Airworthiness Review Program in Notice No. CE-83-1 (48 FR 4290, January 31, 1983) and invited all interested persons to submit proposals for consideration. The goal of the review program was to provide an opportunity for the public to participate in improving, updating, and developing the airworthiness standards applicable to small airplanes, as set forth in part 23 of the Federal Aviation Regulations (FAR). Where applicable, the review program was extended to the new commuter category requirements because that commuter category incorporated existing small airplane requirements, as set forth in Amendment 23-34 (52 FR 1806, January 15, 1987).

In Notice No. CE-83-1A, (48 FR 26623, June 9, 1983), the FAA extended the period for submission of review proposals, invited by Notice No. CE-83-1, to May 3, 1984. Approximately 560 proposals were received in response to Notices No. CE-83-1 and CE-83-1A.

Following receipt of the proposals, the FAA published Notice No. CE-84-1 (49 FR 30053, July 25, 1984) containing the availability of agenda, compilation of proposals, and announcement of the Small Airplane Airworthiness Review Program Conference. That conference was held October 22-26, 1984, in St. Louis, Missouri. A copy of the transcript of all discussions held during the conference is filed in FAA Regulatory Docket No. 23494.

After reviewing the proposals and the public comments received at the conference, the FAA's first related rulemaking action concentrated on updating safety standards related to cabin safety and improved crashworthiness. On December 12, 1986, the FAA published Notice No. 86-19, titled, "Small Airplane Airworthiness Review Notice No. 1" (51 FR 44878). Notice No. 86-19 proposed to upgrade the standards for cabin safety and occupant protection during emergency landing conditions, which included dynamic testing requirements for the seat/restraint systems of small airplanes. The proposals from Notice No. 86-19 were adopted in Amendment 23-36 (53 FR 30802, August 15, 1988).

From the Small Airplane Airworthiness Review Program, Notices No. 2 and 5 were published in the FEDERAL REGISTER as Notices No. 89-5 and 89-6, respectively. These two notices, No. 89-5 and 89-6, were published March 6, 1989 (54 FR 9276 and 54 FR 9338). Action on Notice No. 89-5 will be accomplished in a separate final rulemaking document. This final rulemaking action, resulting from Notice No. 89-6, has been prepared with the consideration of all comments received on that notice.

rules based on both relevant comments received and further review by the FAA. Two of these commenters strongly support the adoption of these proposals.

One commenter believes that ongoing rulemaking actions have resulted in a continuing increase in the cost and complexity of certification requirements for general aviation airplanes. This commenter cites, as an example of this increased cost, the "dynamic testing of an airplane to prove it will meet the new certification requirements," and states that "For a small airplane, this test would mean the destruction of a minimum of 3 to 9 fuselages costing a total of from one to two million dollars." Consequently, this commenter expresses support for the primary category rulemaking (54 FR 9738, March 7, 1989) and urges expeditious adoption of that rulemaking action.

Proposals in this rulemaking action respond to changes in design technology that were not envisioned in the current airworthiness standards and provide an acceptable level of safety for that new technology. Any additional airplane costs that may occur from these proposed new requirements are the result of an airplane manufacturer's selection of the technology for a new airplane design. In regard to the commenter's example of dynamic testing requirements that would require the destruction of several fuselages, the FAA has not been able to identify dynamic requirements that would require destruction of a single fuselage. The FAA believes that this comment refers to the recently adopted dynamic seat testing requirements of Amendment 23-36. The new seat design and dynamic testing needed to establish compliance may exceed the cost of the seat design and static test needed to show compliance with older requirements; however, the net benefits to be realized from the reduction in occupant fatalities and injuries are expected to exceed the increase in cost. Finally, this commenter's recommendation on the expeditious adoption of the proposed primary category aircraft rule is beyond the scope of this notice.

Discussion of Comments to Specific Sections of parts 23, 91, and 135. The following comments and discussion are keyed to like-numbered proposals in Notice No. 89-6.

Proposals 1, 5, 7. These proposals contain the authority citations for parts 23, 91, and 135. No comments were received on these proposals.

Proposal 2. This proposal would retain the existing reliability requirements of current § 23.1309 for airplane equipment, systems, and installations that are not complex and do not perform safety-critical functions. For those cases where the applicant finds it necessary or desirable to include complex, safety-critical systems, this proposal also would provide additional requirements for identifying such equipment, systems, and installations and would define additional requirements needed for their certification. This proposal would permit the approval of more advanced systems having the capability to perform critical functions and whose failure condition would prevent the continued safe flight and landing of the airplane.

Two commenters offer comments on proposed § 23.1309. One of these commenters concurs with the concept of updating the reliability requirements applicable to airplanes not limited to Visual Flight Rules (VFR) flight, but does not concur with this updating for all airplanes. As discussed in Notice No. 89-6, this proposal addresses the systems installed on airplanes and is not limited to the operations approval of the airplane. The airworthiness standards, as adopted in § 23.1309(a), are based on single-fault or fail-safe concepts and experience based on service-proven designs and engineering judgment. These requirements should be used for airplanes whose systems are not complex and do not perform safety-critical functions. Therefore, § 23.1309(a) is structured to allow the use of existing procedures for simple airplane system designs.

Although future airplane designs limited to VFR operations are not likely to include equipment, systems, and installations whose failure condition would prevent continued safe flight and landing of the airplane, the applicability of this requirement, as discussed above, will provide airworthiness standards if the applicant elects to include such systems in the airplane's design. Therefore, the applicability of this requirement has not been revised as suggested by this commenter.

One commenter suggests that the critical environmental system considered in § 23.1309(c) would be better defined by removing the words "such as" from the proposed paragraph and replacing them with the word "including." The FAA agrees that the suggested wording more accurately identifies the intent of this paragraph, as discussed in the notice. The wording of paragraph (e) of § 23.1309 has been revised accordingly.

This same commenter notes that there are proposals being considered for new §§ 25.1315 and 25.1317, which deal with the effects of lightning and external high energy radiated electromagnetic fields, and suggests that similar actions be considered for part 23 rules. Although this comment is beyond the scope of the actions proposed in Notice No. 89-6, the FAA recognizes the desirability of having the various airworthiness standards address like requirements in the respective sections and will consider this comment in future rulemaking actions.

Proposal 3. This proposal adds a new § 23.1311 to provide the requirements for the installation of an electronic display instrument system. It provides a separate section to address the airworthiness standards for those indicators. A significant number of electronic display systems have been approved for installation in part 23 airplanes by means of special conditions.

One commenter asks if the wording of proposed § 23.1311(c), concerning electronic display indicators with features that make isolation and independence between powerplant instrument systems impractical, will be supported by an appropriate amendment to require such isolation. As discussed in Notice No. 89-6, the current requirements of part 23 address powerplant instruments that could provide the required data only by using individual instruments. Accordingly, the isolation and independence referred to in § 23.1311(c) are currently required in § 23.903(c). The objective of this regulation is to allow the use of electronic display indicators that will not provide the isolation and independence considered in the current requirements. The FAA is not considering an additional amendment to address this issue.

Proposal 4. This proposal would revise § 23.1321 to provide that flight instruments to be used by any required pilot be located so that only minimal eye and head movement are needed to monitor the airplane's flight path and these instruments. This proposal would also extend the T-arrangement of the flight instruments to all airplanes that are certificated for flight under instrument flight rules (IFR) and would provide for electronic display indicators to be located in this T-arrangement. No comments were received on this proposal and it is adopted as proposed.

Proposal 6. This proposal would revise § 91.205 to permit the operation of all airplanes with the installation of a third attitude instrument system instead of the gyroscopic rate-of-turn indicator, providing that the instrument and installation comply with the requirements of § 121.305(j). [Part 91 was reorganized and its sections renumbered (54 FR 34284, August 18, 1989). The original proposal would have revised § 91.33, but that section is renumbered as § 91.205.] No comments were received on this proposal and it is adopted as proposed.

Proposal 8. This proposal would revise § 135.149 to establish uniformity in installation requirements when a third attitude instrument system is installed. No comments were received on this proposal and it is adopted as proposed.

evaluation quantify, to the extent practicable, estimated costs to the private sector, consumers, Federal, State, and local governments, as well as anticipated benefits.

Executive Order 12291, dated February 17, 1981, directs Federal agencies to promulgate new regulations or modify existing regulations only if potential benefits to society for each regulatory change outweigh potential costs. The order also requires the preparation of a Regulatory Impact Analysis of all "major" rules except those responding to emergency situations or other narrowly defined exigencies. A "major" rule is one that is likely to result in an annual increase in consumer costs, a significant adverse effect on the economy of \$100 million or more, a major increase in consumer costs, a significant adverse effect on competition, or is highly controversial.

The FAA has determined that this rule is not "major" as defined in the executive order; therefore, a full regulatory analysis, which includes the identification and evaluation of cost-reducing alternatives to this rule, has not been prepared. Instead, the agency has prepared a more concise document, termed a "regulatory evaluation", that analyzes only this rule without identifying alternatives. In addition to a summary of the regulatory evaluation, this section also contains the regulatory flexibility determination required by the Regulatory Flexibility Act and an International Trade Impact assessment. If more detailed economic information is desired, the reader may refer to the full regulatory evaluation contained in the docket.

Economic Evaluation

This regulatory evaluation examines the effect of a final rule to amend parts 23, 91, and 135. The amendments to parts 91 and 135 contained in this rule allow the installation of a third attitude indicator instead of the currently required rate-of-turn indicator. Flight instrument systems now being proposed for installation need not include the rate-of-turn function. Allowing an additional attitude indicator with a dedicated power supply relieves the burden on the manufacturer and allows safer operations because of the greater utility of third attitude indicators.

The amendments to parts 91 and 135 impose no cost on the aviation community or other persons, but rather, include provisions for an alternative.

The amendments to part 23 contained in this rule upgrade airworthiness standards to include design requirements for complex systems critical for safety in small airplanes. These upgraded standards, which are based on proposals submitted at the Small Airplane Airworthiness Review Conference in St. Louis, apply only to aircraft for which an application for a type certificate under part 23 is made after the effective date of this rule. The amendments require examination of systems and equipment for their criticality to continued safe flight and landing of the airplane, require reliability of such systems based on their criticality and set forth standards for installation of instrument systems utilizing electronic display indicators.

Current computer and instrumentation technology has resulted in systems and equipment being available for small airplanes that are novel and unusual relative to what was envisioned and considered when the previous part 23 requirements were promulgated. Therefore, the FAA found it necessary to issue special conditions and expend significant resources to assure adequate airworthiness standards for these systems.

The amendments to part 23 are cost-relieving because they eliminate the need for special conditions processing, which often involves costly and unnecessary delays. In addition, these amendments are optional in the sense that the manufacturers are not being directed to incorporate the newest technology in their future models, but instead are being afforded a set of regulations to observe should they choose the new equipment.

evaluated without these amendments through the special conditions process of § 21.10. Therefore, only a portion of the gross safety benefit estimate actually will be realized. The net benefit would be determined by the extent to which these amendments, as compared to the special conditions procedures, expedite the development of airplanes that employ advanced systems and instrument displays and improve the analysis of their safety and reliability.

International Trade Impact Analysis

The provisions of this rule will have little or no impact on trade for both U.S. firms doing business in foreign countries and foreign firms doing business in the United States. In the United States, foreign manufacturers would have to meet U.S. requirements, and, thus, they would gain no competitive advantage. In foreign countries, U.S. manufacturers would not be bound by part 23 requirements and could, therefore, implement the provisions of the rule solely on the basis of competitive considerations.

Regulatory Flexibility Determination

The FAA has determined that the rule changes will not have a significant economic impact on a substantial number of small entities. The FAA's criteria for a small airplane manufacturer is one with fewer than 75 employees. A substantial number is a number that is not fewer than 11 and that is more than one-third of the small entities subject to the rule.

A review of domestic general aviation manufacturing companies indicates that only two companies meet the size threshold of 75 employees or fewer. Therefore, the amendments to parts 23, 91, and 135 will not affect a substantial number of small entities.

Federalism Implications

The regulations adopted herein will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, in accordance with Executive Order 12612, it is determined that this final rule does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

Conclusion

This document amends the airworthiness standards for complex safety, related critical systems and the installation of electronic display systems. These standards provide design options to the manufacturer that are not available under existing regulations. This document concerns rules that do not impose a burden, but merely afford an alternative, and they will not result in an annual increase in consumer costs or have an adverse effect on the economy. The FAA has determined that this amendment is not major as defined in Executive Order 12291. For the same reason, this amendment is not considered to be significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034, February 26, 1979). Since there are no small entities affected by this rulemaking, it is certified, under the criteria of the Regulatory Flexibility Act, that this amendment will not have a significant economic impact, positive or negative, on a substantial number of small entities. In addition, these final rules will have little or no impact on trade opportunities for U.S. firms

Subpart F—Equipment

GENERAL

§ 23.1301 Function and Installation.

Each item of installed equipment must—

- (a) Be of a kind and design appropriate to its intended function;
- (b) Be labeled as to its identification, function, or operating limitations, or any applicable combination of these factors;
- (c) Be installed according to limitations specified for that equipment; and
- (d) Function properly when installed.

§ 23.1303 Flight and navigation instruments.

The following are required flight and navigational instruments:

- (a) An airspeed indicator.
- (b) An altimeter.
- (c) A magnetic direction indicator.
- (d) For turbine engine powered airplanes, a free air temperature indicator or an air-temperature indicator which provides indications that are convertible to free-air.
- (e) A speed warning device for—
 - (1) Turbine engine powered airplanes; and
 - (2) Other airplanes for which V_{MO}/M_{MO} and V_D/M_D are established under §§ 23.335 (b) (4) and 23.1505(c) if V_{MO}/M_{MO} is greater than $0.8 V_D/M_D$.

The speed warning device must give effective aural warning (differing distinctively from aural warnings used for other purposes) to the pilots whenever the speed exceeds V_{MO} plus 6 knots or $M_{MO} + 0.01$. The upper limit of the production tolerance for the warning device may not exceed the prescribed warning speed.

§ 23.1305 Powerplant instruments.

The following are required powerplant instruments:

- (a) A fuel quantity indicator for each fuel tank.

(e) A tachometer (to indicate the speed of the rotors with established limiting speeds) for each turbine engine.

[(f) A cylinder head temperature indicator for—

[(1) Each air cooled engine with cowl flaps, and for each airplane for which compliance with § 23.1041 is shown at a speed higher than V_Y ; and

[(2) Each reciprocating engine-powered commuter category airplane.]

(g) A fuel pressure indicator for pump-fed engines.

[(h) A manifold pressure indicator for—

[(1) Each altitude engine; and

[(2) Each reciprocating engine-powered commuter category airplane.]

(i) An oil quantity indicator for each oil tank.

(j) A gas temperature indicator for each turbine engine.

[(k) A fuel flowmeter for—

[(1) Each turbine engine or fuel tank if pilot action is required to maintain fuel flow within limits; and

[(2) Each turbine engine of turbine-powered commuter category airplane.]

(l) An indicator to indicate engine thrust or to indicate a gas stream pressure that can be related to thrust, for each turbojet engine, including a free air temperature indicator if needed for this purpose.

(m) A torque indicator for each turbopropeller engine.

(n) A blade position indicating means for each turbopropeller engine propeller to provide an indication to the flight crew when the propeller blade angle is below the flight low pitch position. The required indicator must begin indicating before the blade moves more than 8° below the flight low pitch stop. The source of indication must directly sense the blade position.

temperature for which the limitation is established unless it is shown that the limitation will not be exceeded in all intended operations.

(q) A low oil pressure warning means for each turbine engine.

(r) An induction system air temperature indicator for each engine equipped with a preheater and having induction air temperature limitations which can be exceeded with preheat.

(s) For each turbine engine, an indicator to indicate the functioning of the powerplant ice protection system.

(t) For each turbine engine, an indicator for the fuel strainer or filter required by § 23.997 to indicate the occurrence of contamination of the strainer or filter before it reaches the capacity established in accordance with § 23.997(d).

(u) For each turbine engine, a warning means for the oil strainer or filter required by § 23.1019, if it has no bypass, to warn the pilot of the occurrence of contamination of the strainer or filter screen before it reaches the capacity established in accordance with § 23.1019(a)(2).

(v) An indicator to indicate the functioning of any heater used to prevent ice clogging of fuel system components.

(w) A fire warning indicator for those airplanes required to comply with § 23.1203.

§ 23.1307 Miscellaneous equipment.

(a) There must be an approved seat or berth for each occupant.

(b) The following miscellaneous equipment is required as prescribed in this subpart:

[(1) When performing its intended function, may not adversely affect the response, operation, or accuracy of any—

[(i) Equipment essential to safe operation; or

[(ii) Other equipment unless there is a means to inform the pilot of the effect.

[(2) In a single-engine airplane, must be designed to minimize hazards to the airplane in the event of a probable malfunction or failure.

[(3) In a multiengine airplane, must be designed to prevent hazards to the airplane in the event of a probable malfunction or failure.

[(b) The design of each item of equipment, each system, and each installation must be examined separately and in relationship to other airplane systems and installations to determine if the airplane is dependent upon its function for continued safe flight and landing and, for airplanes not limited to VFR conditions, if failure of a system would significantly reduce the capability of the airplane or the ability of the crew to cope with adverse operating conditions. Each item of equipment, each system, and each installation identified by this examination as one upon which the airplane is dependent for proper functioning to ensure continued safe flight and landing, or whose failure would significantly reduce the capability of the airplane or the ability of the crew to cope with adverse operating conditions, must be designed to comply with the following additional requirements:

[(1) It must perform its intended function under any foreseeable operating condition.

[(2) When systems and associated components are considered separately and in relation to other systems—

[(i) The occurrence of any failure condition that would prevent the continued safe flight and landing of the airplane must be extremely improbable; and

and associated monitoring and warning means must be designed to minimize crew errors that could create additional hazards.

[(4) Compliance with the requirements of paragraph (b)(2) of this section may be shown by analysis and, where necessary, by appropriate ground, flight, or simulator test. The analysis must consider—

[(i) Possible modes of failure, including malfunctions and damage from external sources;

[(ii) The probability of multiple failures, and the probability of undetected faults;

[(iii) The resulting effects on the airplane and occupants, considering the stage of flight and operating conditions; and

[(iv) The crew warning cues, corrective action required, and the crew's capability of determining faults.

[(c) Each item of equipment, each system, and each installation whose functioning is required by this chapter and that requires a power supply is an "essential load" on the power supply. The power sources and the system must be able to supply the following power loads in probable operating combinations and for probable durations:

[(1) Loads connected to the power distribution system with the system functioning normally.

[(2) Essential loads after failure of—

[(i) Any one engine on two-engine airplanes; or

[(ii) Any two engines on an airplane with three or more engines; or

[(iii) Any power converter or energy storage device.

[(3) Essential loads for which an alternate source of power is required, as applicable, by the operating rules of this chapter, after any failure or malfunction in any one power

two engine inoperative condition on airplanes with three or more engines.

[(e) In showing compliance with this section with regard to the electrical power system and to equipment design and installation, critical environmental and atmospheric conditions, including radio frequency energy and the effects (both direct and indirect) of lightning strikes, must be considered. For electrical generation, distribution, and utilization equipment required by or used in complying with this chapter, the ability to provide continuous, safe service under foreseeable environmental conditions may be shown by environmental tests, design analysis, or reference to previous comparable service experience on other airplanes.

[(f) As used in this section, "systems" refers to all pneumatic systems, fluid systems, electrical systems, mechanical systems, and powerplant systems included in the airplane design, except for the following:

[(1) Powerplant systems provided as part of the certificated engine.

[(2) The flight structure (such as wing, empennage, control surfaces and their systems, the fuselage, engine mounting, and landing gear and their related primary attachments) whose requirements are specific in Subparts C and D of this part.]

INSTRUMENTS: INSTALLATION

§ 23.1311 Electronic display instrument systems.

[(a) Electronic display indicator requirements in this section are independent to each pilot station required by the airworthiness standards or by the applicable operating rules for each airplane that is to be approved for operation in IFR conditions.

[(b) Electronic display indicators required by § 23.1303(a), (b), and (c) must be independent of the airplane's electrical power systems.

electronic display indicator's useful life. Specific limitations on display system useful life must be addressed in the Instructions for Continued Airworthiness requirements of § 23.1529;

[(2) Not inhibit the primary display of attitude, airspeed, altitude, or powerplant parameters needed by any pilot to set power within established limitations, in any normal mode of operation;

[(3) Not inhibit the primary display of engine parameters needed by any pilot to properly set or monitor powerplant limitations during the engine starting mode of operation;

[(4) Have independent secondary attitude and rate-of-turn instruments that comply with § 23.1321(a) if the primary electronic display instrument system for a pilot presents this information. Instrument displays that are located in accordance with § 23.1321(d) are considered the primary displays. A rate-of-turn instrument is not required if a third attitude instrument system is installed in accordance with the instrument requirements prescribed in § 121.305(j) of this chapter;

[(5) Incorporate sensory cues for the pilot that are equivalent to those in the instrument being replaced by the electronic display indicators; and

[(6) Incorporate visual displays of instrument markings, required by §§ 23.1541 through 23.1553, or visual displays that alert the pilot to abnormal operational values or approaches to established limitation values, for each parameter required to be displayed by this part.

[(d) The electronic display indicators, including their systems and installations, and considering other airplane systems, must be designed so that one display of information essential for continued

or more physically separate units or components connected together (such as a remote indicating gyroscopic direction indicator that includes a magnetic sensing element, a gyroscopic unit, an amplifier, and an indicator connected together). As used in this section, "primary" display refers to the display of a parameter that is located in the instrument panel such that the pilot looks at it first when wanting to view that parameter.】

§ 23.1321 Arrangement and visibility.

(a) 【Each flight, navigation, and powerplant instrument for use by any required pilot during takeoff, initial climb, final approach, and landing must be located so that any pilot seated at the controls can monitor the airplane's flight path and these instruments with minimum head and eye movement. The powerplant instruments for these flight conditions are those needed to set power within powerplant limitations.】

(b) For each multiengine airplane, identical powerplant instruments must be located so as to prevent confusion as to which engine each instrument relates.

(c) Instrument panel vibration may not damage, or impair the accuracy of, any instrument.

(d) 【For each airplane certificated for flight under instrument flight rules or of more than 6,000 pounds maximum weight, the flight instruments required by § 23.1303, and, as applicable, by the operating rules of this chapter, must be grouped on the instrument panel and centered as nearly as practicable about the vertical plane of each required pilot's forward vision. In addition:】

(1) The instrument that most effectively indicates the attitude must be on the panel in the top center position;

(4) The instrument that most effectively indicates direction of flight, other than the magnetic direction indicator required by § 23.1303(c), must be adjacent to and directly below the instrument in the top center position; and]

[(5) Electronic display indicators may be used for compliance with paragraphs (d)(1) through (d)(4) of this section when such displays comply with requirements in § 23.1311.]

(e) If a visual indicator is provided to indicate malfunction of an instrument, it must be effective under all probable cockpit lighting conditions.

§ 23.1322 Warning, caution, and advisory lights.

If warning, caution, or advisory lights are installed in the cockpit, they must, unless otherwise approved by the Administrator, be—

(a) Red, for warning lights (lights indicating a hazard which may require immediate corrective action);

(b) Amber, for caution lights (lights indicating the possible need for future corrective action);

(c) Green, for safe operation lights; and

(d) Any other color, including white, for lights not described in paragraphs (a) through (c) of this section, provided the color differs sufficiently from the colors prescribed in paragraphs (a) through (c) of this section to avoid possible confusion.

§ 23.1323 Airspeed indicating system.

(a) Each airspeed indicating instrument must be calibrated to indicate true airspeed

calibration error, may not exceed three percent of the calibrated airspeed or five knots, whichever is greater, throughout the following speed ranges:

(1) $1.3 V_{S1}$ to V_{MO}/M_{MO} or V_{NE} , whichever is appropriate with flaps retracted.

(2) $1.3 V_{S1}$ to V_{FE} with flaps extended.

(c) In addition, for commuter category airplanes, the airspeed indicating system must be calibrated to determine the system error in flight and during the accelerate-takeoff ground run. The ground run calibration must be obtained between 0.8 of the minimum value of V_1 and 1.2 times the maximum value of V_1 , considering the approved ranges of altitude and weight. The ground run calibration must be determined assuming an engine failure at the minimum value of V_1 .

(d) For commuter category airplanes, the information showing the relationship between IAS and CAS determined in accordance with paragraph (c) of this section must be shown in the Airplane Flight Manual.

§ 23.1325 Static pressure system.

(a) Each instrument provided with static pressure case connections must be so vented that the influence of airplane speed, the opening and closing of windows, airflow variations, moisture, or other foreign matter will least affect the accuracy of the instruments except as noted in paragraph (b) (3) of this section.

(b) If a static pressure system is necessary for the functioning of instruments, systems, or devices, it must comply with the provisions of paragraphs (b)(1) through (3) of this section.

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